

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

As rescanning documents *will not* correct images,
Please do not report the images to the
Image Problem Mailbox.

New Product Concept Identification Form

ORIGINATOR	<u>New Product Name:</u> Load Lock Vacuum Sensor (LLVS)	<u>Time Spent Reviewing Concept:</u> Sixteen Hours	Project #:
	<u>First Person at MKS to Identify Concept:</u> Name: Jim Stafford		
	<u>First Person in Marketplace to Identify Concept:</u> VRC introduced a combined Pirani sensor and diaphragm sensor to provide a single output from 1 mTorr to 1500 Torr. This sensor will provide the low pressure measurement for base pressure of the load lock as well as the pressure indication for cross over and vent stages of the load lock. Please refer to MKS article in Oct 1997 issue of Solid State Technology for information on this application. Name: VRC ,Varian and Teledyne Hastings		
	<u>Describe How Concept was Identified:</u> Concept was identified by customer visits, review of literature and competitive analysis. The combination of the diaphragm gauge eliminates many of the disadvantages of using a convection type sensor. This sensor improves response time, accuracy and eliminates gas dependence while at the same time allowing rough measurements required for base pressure measurements.		
	<u>Who Else is Aware of this Concept?</u> This concept has been "tossed" around for several years. However, a target market has never been identified. The next expansion in the semiconductor industry will be looking for unique products to reduce cost and increase performance. This new sensor has the potential for achieving both.		
	<u>Product Description:</u> The product that would fit the semiconductor industry would be a transducer type gauge providing a single logarithmic analog output from 1 mTorr to 1500 Torr. A digital version would also be very desirable. The additional cost of the digital electronics (as a % of the sensor cost) would be much less than for a conventional convection sensor cover the same pressure range. In addition, there would be the added advantage of reduce cabling and the number of ports for the user.		
	<u>Time/Window of Product to Market:</u> The completion of the initial 300mm tools for development fabs has reduce the urgency for this product. The real opportunity will be in the cost reduction measures that will be taken by the tool manufacturers as these tools go into production		
<u>Summary:</u> The semiconductor industry is currently designing tools to produce products for the 21st century. Our customers are looking for solutions to specific problems on their equipment. This "new" sensor solves many of the problems that customers have been enduring for the last 10 years. These problems will only get worse as the chamber sizes increase.			

MKS CONFIDENTIAL

New Product Concept Identification Form (Cont.)

CLASSIFICATION					
<u>Division</u>		<u>Market Region</u>		<u>Market Window</u>	
PCIG	<input type="checkbox"/>	N. America	<input checked="" type="checkbox"/>	Tight	<input type="checkbox"/>
Pressure	<input checked="" type="checkbox"/>	Europe	<input type="checkbox"/>	Open	<input checked="" type="checkbox"/>
HPS	<input checked="" type="checkbox"/>	Asia	<input checked="" type="checkbox"/>	Unknown	<input type="checkbox"/>
UTI	<input type="checkbox"/>	Other	<input type="checkbox"/>		
Germany	<input type="checkbox"/>	<u>Market Place</u>		<u>Manufacturing Resources</u>	
Japan	<input type="checkbox"/>	Large	<input type="checkbox"/>	Existing Production Line	<input type="checkbox"/>
Korea	<input type="checkbox"/>	Moderate	<input checked="" type="checkbox"/>	Expansion Required	<input checked="" type="checkbox"/>
		Established	<input type="checkbox"/>	New Line Required	<input type="checkbox"/>
		Customer Request	<input type="checkbox"/>		
<u>ACTION TO TAKE</u>			<u>REASON</u>		
Hold			<input type="checkbox"/>		
Need Cust. Input to Proceed			<input type="checkbox"/>		
Need MKS Input to Proceed			<input type="checkbox"/>		
Begin Regular DEF Proposal			<input type="checkbox"/>		
Begin Expedited DEF Proposal			<input type="checkbox"/>		
Marketing: Date:		Product Mgr: Date:		Product Selection Committee: Date:	
President: Date:		Controller: Date:		Exec. VP Technology: Date:	
VP Pressure Group: Date:		VP PCIG: Date:			

MKS CONFIDENTIAL

Operation: MKS

Vacuum Products

Product Concept: Load Lock Vacuum Sensor

SUBMITTED BY:

Date Submitted: ____/____/____

MKS CONFIDENTIAL

Idea came from:

on date:

Jim Stafford

11/2/97

Concept Approved for Product Definition

Operations Manager and Date: _____

Development Proposal Due: _____

Account Number: _____

New Product Definition Proposal

Definition Proposal

PRODUCT CONCEPT

Business Opportunity

Product Description The sensor would provide a single analog or digital output from 1×10^{-4} to 1000 Torr. The low vacuum range 10-1000 Torr could be gas independent.

Product Type

- ☒ Evolutionary
☐ Incremental
☐ Next Generation

Target Market/Customers Semiconductor OEM manufacturers.
 Load Locks, transfer chambers, and exit chambers.

Market Growth

- ☐ Fast
☐ Normal
☐ Slow

Key Market Needs including Customer's Stated Requirements, Expected Price, and Applications
 Customers needs outlined in MKS article is SST Oct. 1997 issue "Pressure Measurement and Control in Load Locks".
 Three functions

Existing Competitive Product and Sales Price

Varian

\$525.00 sensor only

List Price \$750

Expected Discount \$112 15 %

Expected Average Selling Price \$637 100 %

Material & Labor Cost \$150 23 %

Cost of Selling (5% ASP) \$32 5 %

Direct Margin \$455 70 %

Expected Competitive Product

Teledyne Hastings - solid state sensor
 Balzers

Market Window We Must Hit and Why The next window is cost reduction on 300 mm which may be 1 to 2 yrs.

Annual Market Size at MaturityMarkets

Market 1 \$3 million Semiconductor Equipment

Market 2 6 million Analytical Equipment

Market 3

Total

Market Size 5 million Share % 60% Revenue 18 m

2 million 50% 500k

Effect on Other MKS Products. (Increase or decrease in units and dollars)

Decrease pressure switch and CEP sales
 2 Pressure Switches - 370 x 2 } 1070
 1 CEP 330

Summary... Why should we develop this product? (Develop new market, protect existing market, etc...)

Protect existing market.

Higher margin product because eliminating multiple sensors

Critical Specifications (Examples are accuracy, materials, size, cost, essential features)

Specifications dictated by needs to control pumpdown and vent cycles.
 Hood Lock door activation accuracy 15% gas independent (N_2 , He , Ar) 960 Torr
 Softpump switch accuracy 10% 10 Torr
 Crossover (transfer chamber or process chamber) accuracy 50% 1×10^{-3} Torr

How the Product Will Change the Existing Product Line

This depends very much on how the product is designed.
 If the product is designed using specs above it would complement existing lines. Tradeoff: accuracy vs convenience.

How the Product Differs from MKS and Competitive Alternatives

Product would differ in that it would bring MKS Baratron technology to the table along with its marketing power.

Expected Reuse from Prior Products yes, use existing Baratron and Franc technology

New Manufacturing Processes and Materials Required

Potentially require die attach and wire bonder.

Inventions and Patents (Preliminary) none

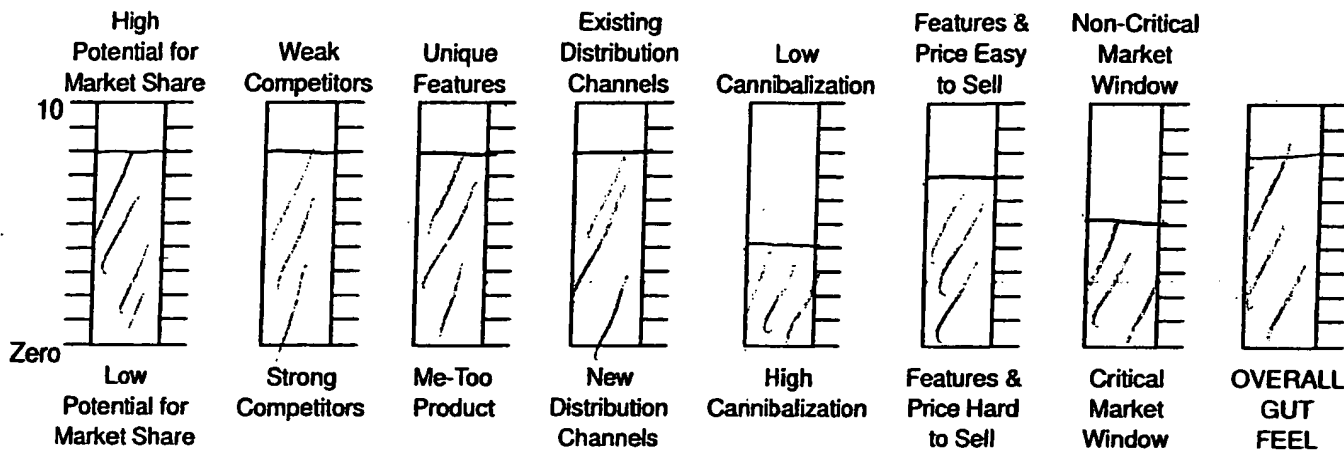
Safety, Regulatory, and Environmental Issues CE mark

Definition Proposal

PRODUCT CONCEPT

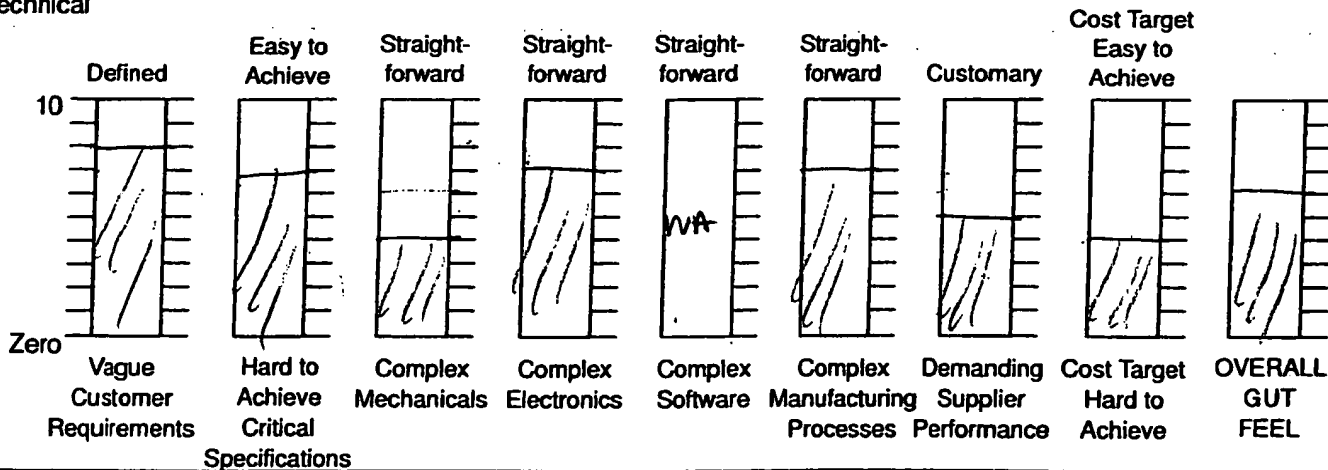
Risk Analysis

Market



Market Risk Summary The risk is that a competitor will come to market that may eliminate the need for several separate "dumb" switches and a prox sensor. This is especially true due to the digitization of the sensors.

Technical



Technical Risk Summary

Risks are
 1) over spending sensor for application
 2) keeping packaging costs down

Progress-to-Date (Technology, specifications, market research, etc...)

There is a general trend to combine sensor technologies to achieve broader range pressure measurement.

In addition adding digital capability to combined sensors will certainly provide cost advantages to users. This eliminates the need to have essentially the same digital components stuck on several sensors.

Obstacles Needing to be Cleared

Determination of technologies/packaging used to meet cost goals.

Definition Phase Team

<u>Function</u>	<u>Name</u>	<u>Weeks Req'd</u>
Team Leader	_____	_____
Marketing	_____	_____
Product Management	_____	_____
Electrical Engineering	_____	_____
Mechanical Engineering	_____	_____
Software Engineering	_____	_____
Applications Engineering	_____	_____
Manufacturing Engineering	_____	_____
Test Engineering	_____	_____
Purchasing	_____	_____
Other: _____	_____	_____
Other: _____	_____	_____
Other: _____	_____	_____

Total Weeks of Effort Required to Complete the Definition Phase: =====

Duration of Definition Phase: _____ Months

Other Needs